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ARBOVIRUS STUDIES IN SÃO PAULO, BRASIL

ANUAL REPORT

BY

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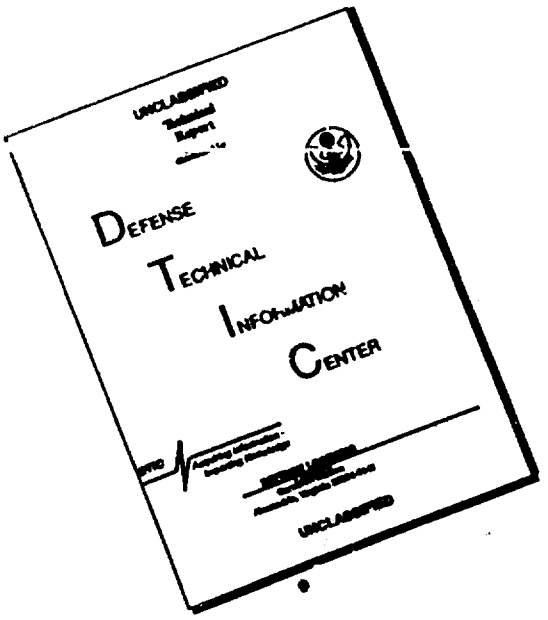

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Introduction

The studies on the epidemiology of the Arboviruses in São Paulo, Brasil, were continued as outlined in the last year report.

The routine to isolate viruses and to collect the samples has already been described in previous reports.

Viruses

The agents isolated and identified this year are shown in Table I. It can be seen that 14 of them were isolated from birds captured in the study areas. The animals were netted during the period from September'66 to April'67 and by CF tests they are all identical, seeming to be different isolations of the same virus. Neutralization tests in TC are in progress.

The prototype choosen was Ar. 5245, the first isolate in the Laboratory. It was shown to be an agent sensitive more than 3 logs to DCA, with an AST of 2,7 for suckling mice inoculated intracerebrally (IC) and 4.0 for those inoculated intraperitorially (IP). The virus killed adult mice inoculated IC in 9 days and those inoculated IP survived and showed a good CF titer in their sera. The agent was f filtered through Millipore Filter with membrane pore size of 450 mm.

Antigens prepared with sucrose-acetone extraction of the baby mice brains showed a hemagglutin (HA) with a titer of 160 for goose cells, and a good CF antigen. Antigens of baby mice sera and liver did not show a HA antigen. This agent produce a good CPE in BHK-21 and VERO Cells.

The virus was tested in HI and CF tests against the following viruses: EEE, WEE, VEE, Mucambo, Pixuna, Mayaro, Yellow Fever (Asibi), SLE, Bussuquara, Ilhéus, Caraparu, Oriboca, Guaroa, Cache Valley, Maguari, California BFS, Icoaraci, Itaporanga, Anhanga, Bororeis, Junin, Tacaribe, Tacaiuma, Guama, Catu, Capim, Guajara, Bush-bush, Manzanilla, Melao, Anopheles A, Tinbo, Turlock, Cocal, Irituia, Acara, Mirim, Cotia. No cross reactions were shown. It seemed to us that we have an agent DCA sensitive, different of all existing in the Laboratory and problably an arbovirus by its behaviour. The agent was sent to Yale Arbovirus Research Unit for further studies.

Another virus, Ar 5881, was isolated from a pool of 100 Aedes serratus captured in Itapetininga on 10/11/66. It killed baby mice IC with an AST of 3.1 and adults IC with an AST of 7.0. It did not kill adults inoculated IP but a good immune sera was obtained. Antigens prepared by sucrose-acetone extraction of baby mice brains, livers and sera did not yeld an HA. In CF tests a reaction was obtained with members of California Complex, being the strongest with Melao virus. Neutralization tests are in progress to see if the virus is a isolation of Melao virus in our area of a new virus in the California Complex.

Another viruses were identified by now. Ar 2984 and Ar 2546 are the same isolation of a virus belonging to the Bunyamwera Group. This

agent was different from all viruses existing in the laboratory and was sent to the WHO World Reference Center at Yale University for final identification. A study of the local population is being made, as some for the human sera here are able to neutralize the agent.

An 3088, Ar 2573, Ar 2494 are new strains of Cotia virus (Am.J. Trop.Med. & Hyg., 14: 156, 1965). These isolations were the first obtained in Casa Grande of a virus isolated in another field station. Its presence in the human population is under study.

Ar 5507 is an agent isolated from 100 A.cruzii collected on 11/5/67 in Casa Grande and it is a new isolation of Bororeia Virus, Ar 395.

Other viruses are being studied. Ar 4253, isolated from Cotia on 1/2/66 of a pool of Psorophora ferox, Ar 6171 from a pool of Wyeomyia confusa collected in Casa Grande on 12/2/66 and Ar 6629 from a pool of Culex collected in Casa Grande on 2/3/67. They seemed to be different from the agents isolated by this laboratory and their identification are in progress.

Ar 6629 was a very interesting isolation because was obtained from mosquitoes collected inside of the houses of the village.

Tentative of Viral Isolation From Human Beings

In spite of the work done by us with the help of the local school teacher, we continue to face a strong resistence from the local population to accuse any illness.

We obtained samples from 2 febrile cases from children attending the school. The viral isolations were negative and the serology, using all the antigens that we have in the Laboratory also did not shown any rise in titer for Artovirus.

From a small city near the border of the State of Parana we received blood from 7 children with fever, headache and signs of envolvment of nervous system. All of them were recently vaccinated against Yellow Fever. The tentative of viral isolations were negative and no rise in titer for arbovirus was observed in the serology. The serological survey made with sera collected in 1966 in Casa Grande was almost completed. The total results are shown in Table II.

It can be seen that the results are almost the same obtained in previous bleeding. Tacaiuma and Bororeia viruses are the more common in the area with a prevalence of 10% for Bororeia virus with 7 convertions to positive and 16% for Tacaiuma virus, with 14 convertions. Other agents isolated localy were also present in the population.

Ar 4175, an agent related to Bororeia virus was positive for only 9 people showing a smaller prevalence than Bororeia virus.

Ar 2984, a member of the Bunyamwera Group was also positive in 7 sera, with prevalence smaller than Bororeia and Tacaiuma viruses.

The antibodies for the B Group were present again, in the levels obtained previously. Bussuquara was the more common virus found, but the titers were low and the pattern seemed to be a cross reaction, as observed previously. We detected 12 convertions.

[illegible]

The [illegible] year [illegible] Table III.

Vertebrates

The [illegible] of the [illegible] shown in Tables IV and V.

The [illegible] later.

For [illegible], in Casa Grande [illegible] individuals [illegible] antibodies for [illegible] (Sarcoma [illegible] Ar [illegible]), [illegible] and NT tests. Ar [illegible] [illegible] the [illegible].

Summary

D[illegible] in Casa Grande [illegible] as [illegible] of the [illegible] for [illegible] in the study areas.

The [illegible] in the blood [illegible] 1965 and 1966 showed [illegible] they were not recently infected.

[illegible] the human beings were infected regularly [illegible] of the [illegible] at night, by mosquitoes that [illegible] their homes. To [illegible] this hypothesis there are the virus isolations from mosquitoes [illegible] the houses. Ar 4175, a member of the Anopheles B Group was isolated in December 1965 for *Anopheles [illegible]* and Ar 68[illegible] [illegible] from *Culex* sp.. [illegible] together with An 4[illegible], from a [illegible] of the village and identical to Ar 4175 [illegible] the village by flying [illegible], from the [illegible] of the forest. Besides, some [illegible] the same rate of the [illegible] and females [illegible] year. If the [illegible] infected in significative [illegible] number, one could think of [illegible] being transmitted during their [illegible] of the forest. But, being the females [illegible] infected, we have to think [illegible] infected inside of their houses. Also, there is a difference [illegible] rate. By this way of thinking it seems that [illegible] recently introduced in the region, and the chance [illegible] infected are [illegible] living there for [illegible] years. This [illegible] the presence of a [illegible] positive for [illegible] virus in Casa Grande study area, if our hypothesis is correct.

But [illegible] to isolate [illegible] from the [illegible] study areas [illegible] order [illegible].

[illegible]

TABLE I

Virus Isolated in 1967 by Source and by Field Station

Birds			
An 5417	Myiobius atricaudus	Casa Grande	28/ 7/66
An 5560	Conopophaga lineata	Casa Grande	19/ 8/66
An 5632	Xanthomyas virescens	Itapetininga	26/ 8/66
An 5742	Schiffornis virescens	Casa Grande	1/ 9/66
An 6109	Dendrocolaptes platyrostris	Itapetininga	24/11/66
An 6142	Dysithamnus mentalis	Casa Grande	1/12/66
An 6157	Haplospiza unicolor	Casa Grande	1/12/66
An 6212	Sporophila caerulescens	Itapetininga	3/12/66
An 6236	Sittasomus griseicapillus	Casa Grande	16/11/66
An 6241	Basileuterus auricapillus	Casa Grande	16/12/66
An 6291	Platyrinchus mystaceus	Itapetinirga	23/12/66
An 6789	Turdus albicollis	Casa Grande	3/ 3/67
An 6829	Emberizoides herbicola	Casa Grande	10/ 3/67
An 7126	Platyrinchus mystaceus	Itapetining	6/ 4/67
Mammals			
An 4229	Philander opossum	Casa Grande	14/ 1/66
Mosquitoes *			
Ar 4253	Psorophora ferox	Cotia	21/ 1/66
Ar 6171	Wyeomyia confusa	Casa Grande	2/12/66
Ar 6629	Culex sp	Casa Grande	3/ 2/67
Ar 6813	A.(K.) cruzii	Casa Grande	9/ 3/67

* = Pools

TABLE II

Results obtained in HI and NT tests with Human Sera from 1966 in Casa Grande *

VIRUS	RESULTS	VIRUS	RESULTS
Group A	0/242	Bunyamwera Group	7/242
EEE		Guaroa	
WEE		Cache Valley	
Mayaro		Ar 2934	7
Mucambo			
		California	0/242
Group B	26/242		
Bussuquara	24	Group Phlebotomus	1/242
SLE	22	Itaporanga	1
YF	5	Icoaracy	
Ilheus	15		
		Tacaiuma	
Group C	8/242	(SP Ar 2317)	47/242
Marituba			
Caraparu	3	Boraceia	
Oriboca	6	SP Ar 395	25/242
		Ar 4175	9/242

* Number of positives / Number of tested

TABLE III

Pools of Mosquitoes Inoculated in 1967

SPECIES	Casa Grande	Itapet.	Cotia	Total
Anophelini				
Anopheles cruzii	108	1	1	110
" strodei		1	18	19
" lutzi	4		3	7
Culicini				
Aedes fluviatilis	1			1
" leucocelaemus	3	1		4
" serratus	14	10	4	28
" crinifer		3	1	4
Culex (Melanoconion) sp	2	3	4	9
" (Microculex) sp			2	2
Mansonia albifera	2	4	13	19
" venezuelensis			1	1
" titilans		1	7	8
Psorophora albipes		2		2
" discrucians		2	1	3
" ferox	15	30	9	54
Uranotaenia ditaenionota			1	1
Sabethini				
Limatus flavisetosus	1	1		2
Phoniomyia pilicauda	78	2	4	84
Sabethes albiprivus	2	1		3
" intermedius	7			7
Trichoprosopon digitatum	1			1
" pallidiventer	35	2	3	40
" reversum	22		1	23
Wyeomyia confusa	24	4	1	29
" leucostigma	1			1
Trichoposopron fluviatilis	11			11
Others Dipterous				
Phlebotomus sp	2			2
Simulium auristriatum				
TOTAL	333	68	74	475

TABLE IV

Birds Netted From August 1966 to December 1967

SPECIES	Itapet.	Casa Grande	Total
Tinamidae			
Crypturellus obsoletus		1	1
Accipitridae			
Accipiter erythronemius	1		1
Falconidae			
Micrastur ruficollis		1	1
Rallidae			
Laterallus sp	1		1
Columbidae			
Columbigallina talpacoti	69		69
Leptotila rufaxilla	7		7
Oreopeleia montana	4	6	10
Cuculidae			
Dromococcyx pavoninus	4		4
Crotophaga ani	5		5
Guira guira	2		2
Psittacidae			
Triclaria malachitacea		1	1
Strigidae			
Otus choliba	2		2
Caprimulgidae			
Hydropsalis brasilianus	1		1
Eleut[illegible]ptus anomalis	1		1
Trochilidae			
Clytolaema rubricauda		1	1
Alcedinidae			
Chloroceryle americana	7		7
Bucconidae			
Bucco sp	1		1
Picidae			
Crysoptilus melanochloros	1		1
Picumnus temminckii	6		6
Dendrocolaptidae			
Dendrocolaptes platyrostris	9	9	18
" squamatus		1	1
Lepidocolaptes fuscus	8	27	35
Campylorhamphus trochilirostris	7	2	9
Sittasomus griseicapillus	15	23	38

TABLE IV

Birds Netted from August 1966 to December 1967 - Cont.

SPECIES	Itapet.	Casa Grande	Total
Furnariidae			
Furnarius rufus	6		6
Synallaxis ruficapilla	10	3	13
Anabazenops fuscus	1	1	2
Syndactyla rufosuperciliata	25	5	30
Xenicopsoides amaurotis		3	3
Philydor atricapillus	2	2	2
" rufus		2	2
Automulus leucophthalmus	42	2	44
Cichlocolaptes leucophrys		3	3
Heliobletus contaminatus	1	7	8
Xenops minutus		2	2
" rutilans	1	1	2
Sclerurus scansor		4	4
Lochmias nematura	8	9	17
Formicariidae			
Batara cinerea		3	3
Mackenziaena leackii	1		1
Thamnophilus caerulescens	22	8	30
" ruficapillus	4		4
Dysithamnus mentalis	13	16	29
Myrmotherula gularis		9	9
Drymophila malura	4		4
Pyriglena leucoptera	2	17	19
Chamaeza campanisoma		1	1
Myrmoderus squamosus		5	5
Conopophagidae			
Conopophaga lineata	55	20	75
Rhinocryptidae			
Merulaxis ater	1		1
Cotingidae			
Attila rufus	1	2	3
" phoenicurus		6	6
Pachyramphus polychopterus	2	1	3
Platypsaris rufus	3		3
Procnias nudicollis	1	1	2
Pipridae			
Piprites chloris		4	4
Chiroxiphia caudata	117	100	217
Ilicura militaris		14	14
Manacus manacus		2	2
Schiffornis virescens	18	28	46
Neopelma aurifrons	2	26	28

TABLE IV

Birds Netted From August 1966 to December 1967 -- Cont.

SPECIES	Itapet.	Casa Grande	Total
Tyrannidae			
Satrapa icterophrys	4		4
Muscivora tyrannus	3		3
Tyrannus melancholicus	5		5
Empidonomus varius	1		1
Sirystes sibilatrix		1	1
Pitangus sulphuratus	5		5
Myiarchus tyrannulus	2		2
Empidonax euleri	32	4	36
Myiobius atricaudus		12	12
Myiophobus fasciatus	14		14
Platyrinchus mystaceus	42	36	78
Tolmomyias sulphurescens	2	3	5
Todirostrum poliocephalum		1	1
" plumbeiceps	1		1
Hemitriccus diops		2	2
Phyllomyias ventralis	8	1	9
Serpophaga subcristata	5		5
Elaenia chiriquensis	30	3	33
" mesoleuca	49	5	54
" cristata	2		2
Camptostoma obsoletum	2		2
Leptopogon amaurocephalus		9	9
Pipromorpha rufiventris	17	62	79
Hirundinidae			
Progne tapera fusca	1		1
Stelgidopteryx ruficollis	11		11
Atopochelidon fucata	1		1
Troglodytidae			
Troglodytes musculus	6		6
Mimidae			
Mimus saturninus	4		4
Ploceidae			
Passer domesticus	1		1
Turdidae			
Turdus albicollis	30	31	61
" amaurochalinus	39	3	42
" leucomelas	2	2	4
" rufiventris	59	24	83
Platycichla flavipes		32	32
Cyclarhidae			
Cyclarhis gujanensis	5	3	8

TABLE IV

Birds Netted From August 1966 to December 1967 - Cont.

SPECIES	Itapet.	Casa Grande	Total
Vireonidae			
Vireo chivi	18	2	20
Hylophilus poicilotis	8	8	16
Coerebidae			
Dacnis cayana	2		2
Coereba flaveola	3		3
Compsothlypidae			
Geothlypis aequinoctialis	3		3
Basileuterus leucoblepharus	8	5	13
" hypoleucus	14		14
" auricapillus	1	10	11
Thraupidae			
Tanagra pectoralis		6	6
Pipraeidea melanonota	1	6	7
Tangara seledon		4	4
" cyanocephala		4	4
" desmaresti		9	9
" cayana	14		14
Thraupis cyanoptera		13	13
" sayaca	32	1	33
Orthogonys chloricterus		3	3
Habia rubica	11	5	16
Tachyphonus coronatus	65	16	81
Trichothraupis melanops	12	48	60
Neothraupis fasciata	1		1
Schistochlamys melanopis	20		20
Icteridae			
Molothrus bonariensis	26		26
Gnorimopsar chopi	2		2
Fringillidae			
Saltator similis	10	10	20
Tiaris fuliginosa	1	1	2
Sporophila caerulescens	38		38
" plumbea	1		1
Volatinia jacarina	9		9
Spinus magellanicus	5		5
Sicalis flaveola	6		6
Haplospiza unicolor	2	19	21
Arremon taciturnus	5	1	6
Myospiza humeralis	12		12
Zonotrichia capensis	149		149
Emberizoides herbicola	7		7
Donacospiza albifrons	2		2
TOTAL	1 362	784	2 146

TABLE V

Trapped
Mammals [redacted] From August 1966 to December 1967

SPECIES	CASA GRANDE	ITAPET.	TOTAL
Rodents			
Muridae			
Rattus norvegicus	35	1	36
" rattus	22	23	45
Mus musculus	1		1
Cricetidae			
Oryzomys nigripes	11	1	12
" laticeps	2		2
" subflavus		1	1
" capito	12		12
Delomys dorsalis	3		3
Nectomys squamipes	4	19	23
Akodon arviculcides	35	19	54
Thaptomys nigrita	4	1	5
Oxymycterus quaestor	13		13
Erethizontidae			
Coendou insidiosus	1		1
Caviidae			
Cavia aperea	3		3
Echimyidae			
Proëchimys iheringi	19		19
Clyomys laticeps		10	10
Not Identified	151	20	171
Marsupials			
Didelphis marsupialis	14	3	17
Monodelphis tricolor	2		2
Philander opossum	6		6
Not Identified		-	1
Bats			
Carrollia perspicilata	2		2
Desmodus rotundus	1		1
Not Identified	94	10	104
TOTAL	435	109	544

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13. ABSTRACT

Reports on continuation of work discussed previously. Collections of birds, animals, and human sera have been studied isolating and screening viruses detected. A few new, or new isolations in the study area have been sent to the Yale Arbovirus Laboratory for final identification or characterization. Isolations were also made from pooled mosquitos collected in the forest, outside of houses, and inside of houses. Continued difficulty experienced in obtaining specimens from ill inhabitants reticent to report illness. Evidence continues to indicate transmission from forest reservoirs into houses by wild mosquitoes. — concept, evidence, remaining problems discussed. Five tables of data included.

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